

**WHAT IS CLAIMED IS:**

1           1. A cable modem, comprising:

2           a central processing unit for controlling the entire cable modem, generating a first enable  
3           signal and a second enable signal, and outputting a data to a data bus;

4           a programmable gain controller, under the control of said first enable signal, for receiving  
5           a modem signal, adjusting gain, and generating a modem signal with adjusted intensity; and

6           a selecting circuit for receiving said first and second enable signals and the modem signal  
7           with adjusted intensity, and under the control of said first and second enable signals, selectively  
8           transferring the modem signal with adjusted intensity to a network.

1           2. The cable modem according to claim 1, further comprising:

2           a tuner for receiving an output signal of said selecting circuit and transferring the output  
3           signal to said network.

1           3. The cable modem according to claim 1, wherein the selecting circuit transfers the modem  
2           signal with adjusted intensity to the network when both first and second enable signals are in a  
3           “high” or “low” state, and does not transfer the modem signal with adjusted intensity to said  
4           network when said first enable signal and said second enable signal are in a different state from each  
5           other.



1           4. The cable modem according to claim 1, wherein the selecting circuit is comprised of:  
- 2           an exclusive NOR circuit for receiving said first and second enable signals and performing  
3           an exclusive NOR operation; and  
4           a switching circuit for receiving an output signal of said exclusive NOR circuit and the  
5           modem signal with adjusted intensity, and under the control of the output signal of said exclusive  
6           NOR circuit, selectively transferring the modem signal with adjusted intensity to said network.

1           5. The cable modem according to claim 3, wherein the switching circuit is comprised of:  
2           an NPN transistor including a base terminal to which the output signal of said exclusive NOR  
3           circuit is applied, and an emitter terminal connected to a ground;  
4           a resistor including one end being connected to the ground; and  
5           a relay including a first terminal connected to a collector terminal of said NPN-type  
6           transistor, a second terminal connected to said resistor, a third terminal connected to a voltage  
7           supply, a fourth terminal to which the modem signal with adjusted intensity is applied, and a fifth  
8           terminal to which an output terminal of said switching circuit is connected.

1           6. The cable modem according to claim 3, wherein the switching circuit is comprised of:  
2           an n-channel metal-oxide semiconductor transistor having a gate terminal to which the output  
3           signal of said exclusive NOR circuit is applied, and a source terminal connected to a ground;  
4           a resistor, of which one end being connected to the ground; and  
5           a relay including a first terminal connected to a drain terminal of said n-channel metal-oxide



6 semiconductor transistor, a second terminal connected to said resistor, a third terminal connected to  
7 a supply voltage, a fourth terminal to which the modem signal with adjusted intensity is applied, and  
8 a fifth terminal to which an output terminal of the switching circuit is connected.

1 7. The cable modem according to claim 5, wherein the resistance is  $75\Omega$  (ohms).

1 8. The cable modem according to claim 6, wherein the resistance matches input and output  
2 impedance of a coaxial system of the network.

1 9. The cable modem according to claim 1, wherein the network is a hybrid fiber coaxial  
2 network.

1 10. The cable modem according to claim 1, further comprising a filter unit filtering high-  
2 frequency elements of the modem signal with adjusted intensity from said programmable gain  
3 controller.

1 11. The cable modem according to claim 1, further comprising a transformer receiving the  
2 modem signal from said programmable gain controller before being sent to said selecting circuit and  
3 said transformer isolating said programmable gain controller from a next stage.

1 12. The cable modem according to claim 4, wherein the switching circuit is comprised of:



2 a transistor including a first electrode of a principal electrically conducting channel, a second  
3 electrode of said principal electrically conducting channel, and a control electrode, said control  
4 electrode regulating a current flow between said first electrode and said second electrode of said  
5 principal electrically conducting channel, said control electrode to which the output signal of said  
6 exclusive NOR circuit is applied, and said second electrode connected to a ground;

7 a resistor including one end being connected to the ground; and

8 a relay including a first terminal connected to said first electrode of said transistor, a second  
9 terminal connected to said resistor, a third terminal connected to a voltage supply, a fourth terminal  
10 to which the modem signal with adjusted intensity is applied, and a fifth terminal to which an output  
11 terminal of said switching circuit is connected.

1 13. The cable modem according to claim 12, further comprised of said first and second  
2 electrodes being of an n-type material.

1 14. The cable modem according to claim 13, with said first terminal and said third terminal  
2 being associated with an operating coil of said relay.

1 15. The cable modem according to claim 13, with said fifth terminal, fourth terminal and  
2 second terminal being associated with an armature of said relay accommodating an electrical contact  
3 from said fourth terminal to either said second terminal or said fifth terminal.



1           16. The cable modem according to claim 15, with the output signal of said exclusive NOR  
2 circuit being in a “high” state, said transistor is turned on, and said relay connects said fifth terminal  
3 to said fourth terminal accommodating said modem signal with adjusted intensity being transferred  
4 to said network.

1           17. The cable modem according to claim 1, wherein the selecting circuit transfers the modem  
2 signal with adjusted intensity to the network when both first and second enable signals are in a  
3 “high”, and does not transfer the modem signal with adjusted intensity to said network when said  
4 first enable signal and said second enable signal are in a different state from each other.

1           18. The cable modem according to claim 17, wherein when said first and second enable  
2 signals are in a “low” state, an internal switch of said programmable gain controller remains to be  
3 off and the modem signal does not flow to said network.

1           19. The cable modem according to claim 1, wherein the selecting circuit is comprised of:  
2           an AND circuit for receiving said first and second enable signals and performing an AND  
3 operation; and  
4           a switching circuit for receiving an output signal of said AND circuit and the modem signal  
5 with adjusted intensity, and under the control of the output signal of said AND circuit, selectively  
6 transferring the modem signal with adjusted intensity to said network.



1           20. The cable modem according to claim 1, wherein the selecting circuit is comprised of:  
2           a first circuit for receiving said first and second enable signals and outputting a signal in a  
3           high state only when both first and second enabling signals are in a high state; and  
4           a switching circuit for receiving the output signal of said first circuit and the modem signal  
5           with adjusted intensity, and under the control of the output signal of said first circuit, selectively  
6           transferring the modem signal with adjusted intensity to said network.

1           21. A cable modem, comprising:  
2           a central processing unit for controlling said cable modem, generating a first enable signal  
3           and a second enable signal, and outputting a data to a data bus;  
4           a programmable gain controller, under the control of said first enable signal, for receiving  
5           a modem signal, adjusting gain, and generating a modem signal with adjusted intensity;  
6           a transformer for receiving an output signal of said programmable gain controller and  
7           isolating said programmable gain controller from a next stage;  
8           a low pass filter for receiving an output signal of said transformer and filtering off a  
9           high-frequency element; and  
10          a selecting circuit for receiving said first and second enable signals and an output signal of  
11          said low pass filter, and under the control of said first and second enable signals, selectively  
12          transferring the output signal of said low pass filter to a network.

1           22. The cable modem according to claim 21, further comprising:



2 a tuner for receiving an output signal of said selecting circuit and transferring the output  
3 signal to said network.

1 23. The cable modem according to claim 21, wherein said selecting circuit transfers the  
2 output signal of said low pass filter to said network when both first and second enable signals are  
3 in a "high" or "low" state, and does not transfer the output signal of said low pass filter to said  
4 network when said first enable signal and said second enable signal are in a different state from each  
5 other.

1 24. The cable modem according to claim 21, wherein said selecting circuit is comprised of:  
2 an exclusive NOR circuit for receiving said first and second enable signals and performing  
3 an exclusive NOR operation; and  
4 a switching circuit for receiving an output signal of said exclusive NOR circuit and the output  
5 signal of said low pass filter, and under the control of the output signal of said exclusive NOR  
6 circuit, selectively transferring the output signal of said low pass filter to said network.

1 25. The cable modem according to claim 24, wherein the switching circuit is comprised of:  
2 an n-channel metal-oxide semiconductor transistor having a gate terminal to which the  
3 output signal from said exclusive NOR circuit is applied, and a source terminal connected to a  
4 ground;  
5 a resistor, of which one end being connected to the ground; and



6 a relay having a first terminal connected to a drain terminal of said n-channel metal-oxide  
7 semiconductor-type transistor, a second terminal connected to said resistor, a third terminal  
8 connected to a supply voltage, a fourth terminal to which the output terminal of said low pass filter  
9 is connected, and a fifth terminal to which an output terminal of said switching circuit is connected.

1 26. The cable modem according to claim 25, wherein the resistance is  $75\Omega$  (ohms).

1 27. The cable modem according to claim 21, wherein said network is a hybrid fiber coaxial  
2 network.

1 28. A method of a cable modem, comprising:

2 controlling said cable modem, by a control unit, generating a first enable signal and a second  
3 enable signal, and outputting a data to a data bus;

4 receiving by a programmable gain controller, under the control of said first enable signal a  
5 modem signal, adjusting gain, and generating a modem signal with adjusted intensity;

6 receiving by a transformer, an output signal of said programmable gain controller and  
7 isolating said programmable gain controller from a next stage;

8 receiving by a low pass filter, an output signal of said transformer and filtering off  
9 high-frequency elements; and

10 receiving said first and second enable signals and an output signal of said low pass filter by  
11 a selecting circuit, and under the control of said first and second enable signals, selectively



12 transferring the output signal of said low pass filter to a network.

1 29. The method according to claim 28, further comprising:

2 receiving by a tuner, an output signal of said selecting circuit and transferring the output  
3 signal to said network.

1 30. The method according to claim 29, wherein said selecting circuit transfers the output  
2 signal of said low pass filter to said network when both first and second enable signals are in a  
3 “high” or “low” state, and does not transfer the output signal of said low pass filter to said network  
4 when said first enable signal and said second enable signal are in a different state from each other.

1 31. The method according to claim 30, wherein said receiving by selecting circuit is  
2 comprised of:

3 receiving by an exclusive NOR circuit, said first and second enable signals and performing  
4 an exclusive NOR operation; and

5 receiving by a switching circuit, an output signal of said exclusive NOR circuit and the  
6 output signal of said low pass filter, and under the control of the output signal of said exclusive NOR  
7 circuit, selectively transferring the output signal of said low pass filter to said network.

1 32. A computer-readable medium having computer-executable instructions for performing  
2 a method, comprising:



controlling a cable modem, by a control unit , generating a first enable signal and a second enable signal, and outputting a data to a data bus;

receiving by a programmable gain controller, under the control of said first enable signal a modem signal, adjusting gain, and generating a modem signal with adjusted intensity;

receiving by a transformer, an output signal of said programmable gain controller and isolating said programmable gain controller from a next stage;

receiving by a low pass filter, an output signal of said transformer and filtering off high-frequency elements; and

receiving said first and second enable signals and an output signal of said low pass filter by a selecting circuit, and under the control of said first and second enable signals, selectively transferring the output signal of said low pass filter to a network.

33. A computer-readable medium having stored thereon a data structure comprising:  
a first field containing data representing controlling by a first unit an entire cable modem, generating a first enable signal and a second enable signal, and outputting a data to a data bus;  
a second field containing data representing receiving a modem signal, adjusting gain, and generating a modem signal with adjusted intensity under the control of said first enable signal; and  
a third field containing data representing receiving said first and second enable signals and the modem signal with adjusted intensity, and under the control of said first and second enable signals, selectively transferring the modem signal with adjusted intensity to a network,  
with said third field further comprising:



10                   a first sub-field containing data representing receiving said first and second enable  
11 signals in a second unit and outputting a signal in a high state only when both first and second  
12 enabling signals are in a high state; and

13                   a second sub-field containing data representing receiving the output signal of said  
14 second unit and the modem signal with adjusted intensity, and under the control of the output signal  
15 of said second unit, selectively transferring the modem signal with adjusted intensity to said  
16 network..